West Nile Virus (WNV) Infection

Information for Clinicians

Clinical Features

- Most patients with WNV infections are asymptomatic.
- Less than 1% of those infected with WNV develop severe disease.
- The incubation period ranges from 3 to 15 days.
- Routes of transmission include mosquito bites and in rare situations blood transfusion, organ transplant, transplacental, breastfeeding, and percutaneous injuries of laboratory workers.
- The full clinical spectrum of WNV infections in this country has probably not yet been described.

Mild Infection

- Approximately 20% of those infected develop a mild, self-limited illness known as West Nile fever.
- Symptoms from mild infection generally last 3 to 6 days.
- Individuals with this form of WNV infection do not progress to more severe disease.
- West Nile fever is characterized by sudden onset of fever often accompanied by:
  - < eye pain
  - < malaise
  - < anorexia
  - < gastrointestinal symptoms
  - < lymphadenopathy
  - < headache
  - < nausea
  - < rash

Severe Infection

- Approximately 1 in 150 infections will result in severe neurological disease.
- The most significant risk factor for severe disease is advanced age.
- Encephalitis and meningitis are the most common severe clinical syndromes.
- Additional symptoms among patients hospitalized with severe disease include:
  - < fever
  - < weakness
  - < gastrointestinal symptoms
  - < change in mental status
- Maculopapular or morbilliform rash involving the neck, trunk, arms, or legs is rare.
- Neurological symptoms include
  - < myelitis
  - < acute flaccid paralysis
  - < ataxia and extrapyramidal signs
  - < tremor, Parkinson-like syndrome
  - < cranial nerve abnormalities
  - < optic neuritis
  - < polyradiculitis
  - < seizures

When to Suspect WNV Infection

Diagnosis of WNV infection is based on a high index of clinical suspicion and specific laboratory tests. Testing for WNV or other arboviral disease such as St. Louis encephalitis should be strongly considered in:

- Adults ≥18 years with unexplained encephalitis or meningitis, particularly in summer or early fall.
- Children < 18 years hospitalized with encephalitis.
- Any case of acute flaccid paralysis or presumptive Guillain-Barré syndrome.

Local presence of WNV infection in animals or other human cases should further raise suspicion.

Recent history of travel, transfusion, transplant, or vaccination may be important.

Laboratory Findings

- Total peripheral leukocyte count is usually normal or elevated, but lymphocytopenia and anemia have been described.
- Cerebrospinal fluid (CSF) may show pleocytosis, usually with lymphocyte predominance; protein is usually elevated and glucose normal.
- Hyponatremia may be present, particularly with encephalitis.
- Computed tomographic (CT) scans of the brain are normal, but magnetic resonance imaging (MRI) may show enhancement of the leptomeninges, the periventricular areas, or both.

Diagnosis and Reporting

Diagnostic Testing

WNV testing for patients with encephalitis or meningitis can be obtained commercially or through the Washington State Department of Health Public Health Laboratories (PHL).

- The most efficient diagnostic method is detection of IgM antibody to WNV in serum or CSF collected ≥8 days after illness onset using the antibody capture enzyme-linked immunosorbent assay (MAC-ELISA). Since IgM antibody does not cross the blood-brain barrier, IgM antibody in CSF strongly suggests central nervous system infection.
- After consultation with the local health jurisdiction, serologic testing for **hospitalized** patients may be obtained through the PHL.
- Testing to detect mild infection in non-hospitalized patients can be obtained from commercial laboratories.
- Patients recently vaccinated against or infected with related flaviviruses (e.g., yellow fever, Japanese encephalitis, dengue) may have positive (cross-reactive) WNV MAC-ELISA results.
- Based on the clinical presentation, diagnostic testing should be obtained to rule out other conditions such as herpes encephalitis, or meningitis due to fungal, bacterial, or parasitic pathogens.

Reporting Suspected WNV Infection

- WNV encephalitis is on the list of designated nationally notifiable arboviral encephalitides. The timely identification of persons with acute WNV or other arboviral infection may augment the public health response to reduce the risk of additional human infections.

Treatment

Treatment is supportive, often involving hospitalization, intravenous fluids, respiratory support, and prevention of secondary infections for patients with severe disease.

- Ribavirin in high doses and interferon alpha-2b have some activity against WNV in vitro.
- A controlled trial evaluating the use of interferon alpha-2b is ongoing for WNV meningoencephalitis in adults.

DOH Website:
Clinical information is available at: www.doh.wa.gov/notify/nc/wnv.htm
Environmental information is available at: www.doh.wa.gov/ehp/ts/Zoo/WNV/WNV.html

For additional clinical information, please refer to Petersen LR and Marfin AA, "West Nile Virus: A Primer for the Clinician

[Review],” Annals of Internal Medicine (August 6) 2002: 137:173-9.

For clinical and laboratory case definitions, see “Epidemic/Epizootic West Nile Virus in the United States: Revised Guidelines for Surveillance, Prevention, and Control, 2001,”at www.cdc.gov/ncidod/dvbid/westnile/surv&control.htm